

collected from more oceanic sites (e.g., Core Sound, Bogue Sound). In some cases, the difference in antibacterial activity between these different geographic sites was greater than 500%.

We also found that the level of hemocyanin in the hemolymph was significantly lower in crabs in the Pamlico River compared to reference sites (i.e., Core and Bogue Sounds). Hemocyanin is the oxygen-carrying protein in crab hemolymph. There was no difference in hemocyanin levels between clinically normal crabs and those with shell disease.

The lower immunological competence of blue crabs in the riverine areas of the A/P Estuary may be a natural consequence of physiological changes that are associated with adaptation to these low salinity environments. However, this lower immunocompetence may also indicate that some type of pollutant(s) is(are) reducing the natural resistance of these crabs. In either case, it may explain why shell disease problems have been centered in these riverine areas. Evidence that crabs in these riverine areas have a higher risk of developing shell disease is also suggested by our preliminary studies where we held crabs in tanks exposed to either water from Bogue Sound or the Pamlico River. The former remained clinically normal, while crabs exposed to Pamlico River water developed shell disease lesions that have been seen in naturally affected crabs from that area.

The results of these studies suggest that there are significant physiological/immunological changes between crabs in different areas of the A/P Estuary. Further studies should be performed to determine whether these changes are due to natural environmental effects or are instead due to anthropogenic factors. The results of these studies may allow the development of a sensitive and ecologically relevant indicator for assessing the health of crustacean fishery populations and might be useful in a broader sense for assessing the general health of these aquatic ecosystems.